California State Journal of Medicine

OWNED AND PUBLISHED MONTHLY BY THE CALIFORNIA MEDICAL ASSOCIATION

BALBOA BUILDING, SECOND AND MARKET STREETS, SAN FRANCISCO

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VOL. XXI DECEMBER, 1923 No. 12

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THE TREATMENT OF HYPERTENSIVE VASCULAR DISEASE*

By WILLARD J. STONE, M. D., Pasadena, California

In articles upon this subject written nearly ten years ago, my main contentions covered the clinical fact, verified upon many occasions, that the majority of all patients manifesting arterial hypertension fell into one of two groups designated as follows: (1) The cardiac type of hypertension, or (2) the cerebro-renal type of hypertension.

It was also suggested that the term vascular disease, as described by Richard Bright in 1836, be used to cover in a broad sense, and until more definite knowledge was available, the symptom-complex of arterial hypertension with its associated or concomitant cardiac, renal, and cerebral symptoms.

A study of the literature of the past two decades has shown that:

1. It has not been proven that arteriosclerosis, many times associated with hypertension, is the cause, *per se,* of this symptom.

2. Many patients with evident sclerosis do not manifest hypertension while arteriosclerosis and nephritis of the vascular type may exist without earlier history of antecedent or concomitant hypertension.

3. Vasomotor spasm involving the smaller arterioles and pre-capillary areas may, however, still be regarded as a tentative explanation of hypertonus.

4. It has not been proven that the primary cause *of the majority of instances* of hypertension has originated in a nephritis. Occasionally, in young individuals an acute nephritis will be observed in which it may be believed, from the evidence, that serious damage has occurred. In such cases, as time elapses and the disturbed kidney function assumes a progressive character, a rise in the diastolic pressure may occur. Under such conditions it may be natural to assume that the cause of the hypertension had its origin as a result of the nephritis. Such a course of events does not, however, occur in the majority of cases manifesting hypertension as a symptom.

5. Nephritis may co-exist or may have resulted from causes which have operated to produce the vascular disease with associated hypertension as a symptom, in the same manner that albuminuria and polyuria may be symptoms.

6. The balance of evidence points to the fact that every patient who has persistent hypertension has suffered more or less renal damage. The extent of the damage may be difficult to estimate, but from a clinical standpoint and its influence upon treatment, such damage may be believed to exist.

7. It has been believed by many investigators that hypertension of itself could not produce arteriosclerosis. That is, given normal vessel walls, it has been believed that other factors were necessary to produce the arterial changes. It has been believed from all the evidence that vessel walls of poor hereditary stock may develop, as the result of a variety of toxins, varying degrees of rigidity and contraction which interfere seriously with the function of a variety of organs; namely, the heart, kidneys, and cerebrum.

8. While it is true that different individuals may possess different degrees of stock in their arterial walls it is also apparent that the care given the stock they possess may be responsible for the length of time it endures for the performance of normal function.

From a practical standpoint and at the risk of empiricism it has appeared best, until more definite knowledge is available, to regard the symptom-complex of hypertension with its associated cardiac, renal, and cerebral symptoms, as part of the manifestations of generalized vascular disease. Such a view has seemed to possess the definite advantage of simplicity, while it serves to eliminate academic

* Presented to the Section on Medicine at the Fifty-second Annual Session of the California Medical Association.

discussion which has not, so far, clarified the situation. With the idea in mind that there may exist varying phases of the same malady it has seemed unnecessary to use the term "primary or essential hypertension." This term lays stress upon and magnifies the hypertensive element of the disturbance, a state of affairs no more warranted than the use of any other symptom at one time or another present during the course of a progressive disease.

THE CARDIAC TYPE OF HYPERTENSIVE VASCULAR DISEASE

Patients who fall into this group manifest the following symptoms:

1. Evidence of vascular changes involving the peripheral arteries. These changes refer particularly to rigidity, but without evidence of contraction of the arterioles.

2. The systolic pressure may be high if the heart muscle is compensating for the added work made necessary in the endeavor to maintain circulatory equilibrium because of rigid inelastic vessels. The diastolic pressure will usually be found to be within normal limits since the lumen of the vessels is not contracted. *The usual pressure ratios will be found to be within the following range: Systolic pressure, 180-200; diastolic pressure, 80-100.* The distinctive feature of this group will be found to be the comparatively low diastolic pressure with an increased systolic pressure.

3. Practically all patients of this group will show cardiac hypertrophy. This has not resulted from peripheral resistance, as measured by the degree of contraction of the vessels, but apparently because of associated changes necessitating increased heart work, such as sclerotic damaged valves, sclerosis of the aortic arch, or as a result of extra-cardiac factors, such as liver cirrhosis, gout, syphilis, or the toxins of a variety of infectious processes which have had direct deleterious effects upon the blood-vessel walls. Prolonged hard physical labor deserves consideration in this connection.

4. The patients of this group do not commonly show symptoms of nephritis, such as nocturia, fixation of specific gravity toward the lower levels, or blood nitrogen retention, especially of creatinin. When albumin and casts are found they have resulted, as a rule, either from stasis due to heart muscle weakness or to vessel changes involving the kidneys; that is, arteriosclerotic changes rather than a true nephritis in the pathological sense of the term.

5. When death occurs among the patients of this group the symptoms and autopsy findings point to gradual or sudden failure of the heart muscle. The systolic pressure may remain high until the heart muscle begins to fail and then falls rapidly as the muscle tone diminishes (the so-called primary high-secondary low sequence).

6. Since the increased systolic pressure may be regarded as a compensatory effort on the part of the myocardium to supply adequately the periphery with blood, treatment should be directed toward maintaining the heart muscle tone. There still exists in the minds of many physicians a digitalis-phobia, due to the teachings of earlier text-books, with the result that this valuable remedy is withheld from many patients because of the fear of increasing the blood pressure. Large doses, as given in young individuals for the relief of more acute conditions, should not be used, but, since the purpose in administering any drug is to secure the effect desired, the dosage of digitalis should correspond with the urgency of symptoms. In such a condition as an acute edema of the lungs large doses of a suitable preparation administered subcutaneously, intramuscularly, or intravenously will be necessary to save life. In such an acute condition of heart muscle failure the *intravenous* administration of caffein sodio-benzoate, grains two and one-half, should also be used. Nitroglycerin or other vaso-dilating drugs are rarely indicated, because, according to our present understanding of the physics of the circulation, it should be our aim to assist in maintaining an adequate blood supply to the periphery, which includes the cardiac and respiratory centers in the medulla. In other words, the attempt should be made to sustain the systolic pressure rather than lower it.

7. In general, aside from specific indications noted above, the hygiene of proper living as applied to such patients should receive proper consideration. This refers particularly to food regulation, especially if obesity exists, and the attempted control of this disturbance of metabolism. This will many times involve consideration of a possible hypothyroid state and the determination of the basal metabolic rate. The possibility of hypothyroidism in such patients has not generally been appreciated. The American Actuarial Tables have amply demonstrated the serious influence of obesity upon individuals with disturbed heart function associated with hypertension, since a relatively large percentage of deaths among such individuals occur from so-called heart failure. Many such patients have been excessive users of starch foods. For individuals manifesting anxiety and restlessness with disturbed sleep, mild sedatives are indicated.

THE CEREBRO-RENAL TYPE OF HYPERTENSIVE VASCULAR DISEASE

The patients who fall into this group manifest the following symptoms:

1. A high diastolic pressure as evidence of the contraction of the peripheral vessels. If the heart muscle is compensating for the increased peripheral resistance, the systolic pressure will also be found to be increased. *The usual pressure ratios under such conditions will be found to be within the range—systolic pressure, 180-240; diastolic pressure, 120-150.*

2. Definite evidences of disturbed kidney function or nephritis exist in the majority of patients of this group. Nocturia will usually be found to be present, with a tendency toward fixation of specific gravity toward the lower levels. Periodically, albumin and casts may be found in urine specimens. With disturbed kidney function, there will be difficulty in excreting solids and the tendency to abnormal retention of nitrogen in the blood may be marked. This refers particularly, in the earlier stages of the disease, to uric acid and sugar reten-

tion, and in the later stages to abnormal creatinin retention. The abnormal retention of these substances in the blood surely cannot be regarded as a physiologic condition. While it may be granted "no definite proof exists that a low protein diet is effective in lowering blood pressure or a high protein diet in raising it," [1] the fact remains that when disturbance of kidney function has occurred, as part of the disease process, many patients are benefited by a dietary regime, based upon their metabolic requirements, which takes into consideration a lowered protein and purin intake. In other words, while it may be true that a high protein diet may not be responsible for the development of hypertension *per se,* there can be little doubt that such a diet would be unwise for patients who have developed disturbed kidney function or nephritis as part of their vascular disease. It all depends upon whether the point of view leads one to treat the patient's disturbed physiology or whether one is content to treat the hypertension which, after all, should be regarded as a symptom of the vascular disease.

3. Since evidences of disturbed kidney function exist in a majority of the patients of this group, blood chemistry studies repeated often enough to enable one to judge the extent of disturbed metabolism are of great assistance.

4. In the majority of patients of this group, cardiac hypertrophy will be found. Cardiac symptoms are many times prominent features of this condition, but it has been my experience that a relatively small percentage (10 per cent) of such patients die from the cardiac disability itself.

5. The greatest danger to patients with contracted vessels and high diastolic pressure has, in my experience, occurred from cerebral thrombosis, hemorrhage, or edema frequently designated uremia,

6. On the other hand, despite the evidence of kidney dysfunction or nephritis, anuria has been a relatively uncommon occurrence among patients of this group. The cerebral danger has appeared to be much greater.

7. Whether the cardiac or the cerebral danger is the greater may depend to a large degree upon the localization of vascular weakness. In one patient the cerebral vessels may be less able to stand strain than the coronary vessels.

8. The treatment of patients who manifest symptoms of the cerebro-renal type of hypertensive vascular disease may be so planned as to take into consideration:

a. The correction of disturbed physiology so far as possible by diet, which enables them to live within the functional capacity of their kidneys. This is best secured by a so-called basic-alkali diet [2] with moderate restriction of salt, coffee, and the limitation of tobacco. Under this heading should be included investigation into possible endocrine disturbances, which include determinations of the basal metabolic rate and the consideration of possible pituitary and, at the time of the climacteric, ovarian dysfunction.

b. The regulation of the lives of these patients should be so planned that rest and freedom from worry can be secured if possible. The physician will render a very distinct service if it is possible to secure realization of the fact that former capacities for work should many times be limited. The advice so frequently given to retire from business is particularly unfortunate in many instances, for many such patients may live long lives of continued usefulness if they can be made to realize certain limitations. The best advice for such patients is to continue with their work and play, but to be moderate in all things.

c. Adequate bowel elimination, which is best secured by simple saline laxatives, such as sodium phosphate or magnesium sulphate.

d. Hydrotherapeutic measures, such as the cabinet bath, to secure elimination through the skin once or twice weekly. Such measures should be carefully controlled and not overdone.

e. The use of vasodilators for the relief of cardiac and cerebral symptoms, such an anginoid pains or pressure headaches. Benzyl benzoate has been found of value in the prevention of attacks of angina pectoris or cerebral crises. It should be administered for a long period of time.

f. The use of digitalis is many times indicated for its effect upon the heart muscle when its function is disturbed as a result of overwork due to the increased peripheral resistance (high diastolic pressure). The cerebral symptoms, many times present under such conditions, are the results of heart muscle weakness and inadequate supply to the medullary centers. The fear that the use of digitalis will increase the blood pressure is not founded upon clinical fact or experience. It is to be regretted that more physicians have not realized the value of this remedy when heart muscle weakness develops as an incident in hypertensive vascular disease.

g. Venesection may be of value, especially in plethoric, obese individuals, for the relief of acute symptoms, such as an acute edema of the lungs or right heart dilatation which has resulted from persistent cough incident to the bronchitis of elderly people, or for the relief of cerebral vascular crises.

h. Although much of the present-day radicalism regarding the elimination of chronic foci of infection in tonsils or about teeth may be followed by more conservatism, it must be conceded that it should be the endeavor of the physician to eradicate foci in these or other localities whenever it can be done *without undue risk.* It is impossible to evaluate correctly the results so far obtained as regards life expectancy for such patients.

i. Not the least of the duties of the physician should be concerned with the attempt to allay the fear which many patients with hypertension possess. It has come to pass that nearly every bathhouse

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[1] Quotation from Editorial Discussion, J. A. M. A., 1923 (April 7), LXXX, 1004.

[2] **Basic-alkali foods** are those in which there is excess of base or alkali over acid. The following foods are so classed as based upon the ash analysis of Sherman and Gettler and have been tested on man by Blatherwick. **Fruits:** Raisins, muskmelons, dried pears, oranges, currants, bananas, lemons, peaches and apples. **Vegetables:** Lima beans, dried beans, beets, carrots, celery, lettuce, potatoes, cauliflower, cabbage, radishes, turnips, asparagus. **Nuts:** Almonds and chestnuts. **Miscellaneous:** Cow's milk.

The following are classed as **neutral foods** and may be freely used by the patient: Sugar, cornstarch, tapioca, lard, cream and butter.

attendant or cultist of mediocre education has a blood pressure apparatus, the use of which may be believed to exist not so much because of knowledge enabling the user to judge of the problem, but rather because of a desire to appear interested. So far as that is concerned, I can see no valid reason why the use of a blood pressure apparatus should not be permissible just as it is permissible to use a clinical thermometer. The use of both may indicate progress, but after all it is proper interpretation in the use of either instrument that counts. Patients should be made to realize that physicians are coming to a better understanding of the problem, and that they are gradually getting away from the bugaboo of high blood pressure as an entity. May the day soon pass when patients are told that their blood pressures are high, and may they be made to believe that the hypertension phase of their malady is no more important than other aspects of a generalized disturbance not perhaps apparent to them.

(Security Building.)

DISCUSSION

George E. Ebright, 209 Post Street, San Francisco—Dr. Stone is to be congratulated upon the concise and scholarly presentation of a subject, the importance of which is measured by the tremendous number of people suffering from the condition of which he treats. Vascular disease associated with hypertension might seem to be, in a figurative sense, the bodyguard of the Great Reaper which is thrown into the fray against human life after the front line division of infectious diseases, preventable diseases and other accidents had failed of their object during the youth and middle life of the army of human individuals. That the attack upon the integrity of the vascular system is a thing the brunt of which is borne by pre-senile and senile individuals. That therefore, hypertensive vascular disease and senility are in more than a restricted sense synonymous.

Dr. Stone observes it has not been proven that arteriosclerosis is the cause of hypertension. He could go farther and say that hypertension precedes arteriosclerosis in most cases and that the factors which produce hypertension plus the increased load upon the arteries and the heart of heightened blood pressure have as their result deteriorated vessels. The interesting point is the question of the original cause of hypertension, and it must be confessed that our present state of knowledge upon the subject does not permit a complete answer to the question. A few points, however, are of interest. During the examination of recruits in the draft of the army during the recent war it was observed that men apparently healthy under the age of thirty presented themselves with high blood pressure. Inasmuch as these men had been called from their usual activities and occupations to embark upon a long and hazardous expedition, it was natural that their departure should be attended with unusual feasting and general overtaxing of the alimentary function. The examining surgeons soon learned that a dose of salts and an abstemious diet promptly resulted in the re-establishment of normal blood pressure. It is repeatedly observed, moreover, that men of great mental activity and responsibility and of sedentary habits present high blood pressure long before there is deterioration of either blood vessels, heart or kidneys, and that regulation of their lives, in which attention is paid to proper recreation and lightening of the work of the digestive tract, results in correcting the vascular tension. I have often seen an association between prolonged mental worry and hypertension. Very possibly the link between the two consists of derangement of the digestive function upon the basis of nervous influences. It is interesting also to observe that many such people with essential hypertension present an increased basal metabolic rate. Enough evidence is before us, I believe, to emphasize the fact that a consideration of the function of the digestive system deserves attention in contemplating the various causes of vascular hypertension, and that vascular hypertension must be considered always as a menace to the integrity of the blood vessels, heart and kidneys.

Dr. Stone (closing)—While it is probably true, as Dr. Ebright has stated, that hypertension may precede arteriosclerosis in some instances, it should be emphasized that arterial rigidity is a natural sequence of the passage of time for every individual. The vast majority of individuals who reach the age of 60 years have undoubted arterial rigidity, and yet many of them do not have hypertonus. In other words, a condition rather than a disease is present.

Hypertonus only occurs, according to my conception, when the smaller arteries are contracted. They may also be rigid and definite arteriosclerosis exist, but the essential thing is that their lumen is contracted. This indicates a pathologic state rather than a condition associated with advancing years.

It is of importance, clinically, to differentiate these two types, for not only is the treatment dependent upon an understanding of the basic disturbance, but the prognosis as well.

Some Problems of Medical Journalism—Colorado Medicine publishes a very interesting article entitled, "Editing the Journal." In this article attention is called to the amount of work, initiative and system required in producing the ordinary medical journal. This is followed through from the selection of material, known as copy, which is to be edited, oftentimes rewritten, the preparation of editorial matter which the editor must either extract from his own brain or extract from the brains of obliging confreres, the procuring of news items gathered from all quarters of the State and in a variety of ways, the correction of galley proof, arranging of material into form proofs, making up the index, and last but not least, getting the journal addressed and into the mails so that everyone entitled to the current number will receive it. This does not include the procuring of advertising, arranging it in the proper form, and elimination of advertising that is objectionable in the advertising copy.

Any State journal can be made better if the editor has the assistance and co-operation of the profession. Contributors can make it easier if they will take the trouble to have their articles not only typewritten but carefully edited as to grammatical construction, paragraphing, punctuation, and attention to clarity and conciseness of expression. Secretaries of county medical societies can help the Journal as well as their organizations if they will furnish condensed reports of the meetings of their respective organizations, together with abstracts of the more important papers. News notices, especially those relating to deaths, marriages, removals, and other occurrences of especial interest to the physicians of the State, must be obtained through officers of medical societies, individuals, or from the more uncertain news clipping bureaus. If these items could be sent in by those who are most familiar with them, it would add to the completeness of the Journal. Finally, the editor needs helpful assistance from those who can render it, and at all times he welcomes constructive criticism and suggestions to aid him in betterment of his work. It is presumed that the editor of each medical journal tries to produce a periodical which is a credit to him as well as to the association which he represents, and he will do his best when he knows that he has the encouragement and co-operation of the entire medical association, for that stimulates him to his best efforts.—(Editorial, Journal Indiana Medical Association.)